not suffer in the least. With every setting into action of the function of deglutition the heart-beats were accelerated. This increase increases with the increasing number of acts of deglutition, and is inversely proportional with greatness of the time-interval between the acts of deglutition; the shorter the time between deglutition, so much more accelerated is the heart-beat. After the acceleration ensues a stage of slowing below normal. This slowing is absolute, and in the matter of percentage lower than the acceleration, and by separate acts of deglutition difficult to perceive. By a normal pulse of seventy-two in a minute, and an interval between acts of deglutition of one second, the acceleration amounts to thirty-three to thirty-five per cent., the slowing eighteen to twenty-three per cent., of the normal pulse. The acceleration as well as the slowing depend in no manner upon the quantity and the quality of the swallowed material, but are solely associated phenomena of the calling into action of the act of deglutition. During deglutition the blood-pressure sinks. Whilst the excitation of the centre is going on the necessity of breathing is lowered.

If a series of acts of deglutition are begun simultaneously with the act of suspension of breathing, the suspension would be broken sooner if there was no deglutition. Deglutition exercises an inhibitory influence upon the labor-pains, and also upon erection of the penis. Thus by fourteen to eighteen acts of deglutition at intervals of a second, the erection is completely overcome. We possess in the spread of excitation of the centre of deglutition to neighboring centres a safe isolated example of the general law of irradiation as a general peculiarity of the nervous system. Irradiation is a common property of motor excitations and also of inhibitory excitation. The excitations of reflex inhibition undergo summation after the same laws as the excitations of reflex movement.

He also found that deglutition stopped the singultus which is seen in normal conditions. He did not try its effect in the singultus of disease.—*Archiv für Physiologie*, Von DuBois-Reymond, 1883, zweites und drittes Heft.

THE TRANSFUSION OF DILUTED BLOOD.—Professors Kronecker and Martius have made experiments upon this subject. By the name of "salt-frogs" (after Cohnheim) the animals were prepared as follows: Through the central end of the divided abdominal median vein a six-tenth per cent. of salt solution was conducted, till the fluid at the peripheral ends became colorless or very lightly colored. It is generally supposed that the whole quantity of blood is replaced by salt-solution, but this is not true. If after the first transfusion the out-flowing fluid is microscopically examined blood corpuscles are found, hence the frog is not robbed of all his blood. If the frog is allowed to rest twentyfour hours after the first transfusion, and then transfused again, then the fluid coming out of the animal is colored red, and is rich in blood corpuscles. The same result is found after a third transfusion of salt solution. If after repeated tranfusions the last remnants of blood are removed from the body of the frog, then no vital action is visible.

In living salt-frogs there is never a complete substitution of the blood by the salt solution, but only a degree of dilution of the blood. Generally, the nervous system is the most sensitive to the removal of nourishment by the dilution of the blood, and the cerebrum is more sensitive than the medulla oblongata, and this is more sensitive than the spinal cord. After the functions of the central nervous system completely cease, the heart continues to beat. Finally only direct nerve and muscle irritability remain. Their conclusions are as follow :

In the first stage of transfusion, usually after the first, the frog behaves like one robbed of his cerebrum. He sits breathing quietly, seldom makes spontaneous movements, and has the croak-reflex. In the second stage, after a second transfusion, the croak-reflex disappears. The characteristic of this stage is the irregular respiration (Cheyne-Stokes), first seen by Luchsinger. In the third stage, after further transfusion, the respiration is either arrested or there are only separate and irregular respiratory movements, often started up by reflected peripheral irritations. The most marked here is the heightened reflex excitability. The frog is as if a section had been made between the medulla and the spinal cord. In some cases the elevation of reflex irritability is so great that they appear as though weakly under the influence of strychnia. After weak irritations there often ensues strong spasmodic extension of the posterior extremities. This stage of heightened excitability disappears very quickly, and often is suddenly followed by a complete loss of reflex irritability. The heart, however, continues to pulsate. When it ceases the last remnant of vital action is lost. When the transfusion is not extreme there ensues a partial recovery in a day or so. The sitting, croaking, without-a-will frog has his intelligence partially restored. He does not croak, and instead of the Cheyne-Stokes respiration, the breathing resumes its normal type. On the other hand, animals with a heightened reflex so great as to have spasms do not recover, but quickly die. The frog conducts himself after repeated transfusions with salt solution as one whose heart had been removed. This leads to the hope that the transfusion of fluids of serum-albumen (corresponding to those used with the frog's heart) in the salt-frogs would serve the purposes of nutrition in such a manner that it would be possible to draw some conclusions about the causes of activity of the vital centres. In Cohnheim's experiments the substitution of blood or serum of warm-blooded animals for blood of the frog was very badly borne. The blood or serum which was suitable for the frog's heart, when thrown into the vascular system, caused no symptoms of recovery ; but generally they died sooner than those without any substitute for their blood. —*DuBois' Archiv*, 1883, 2 and 3 Hft.

VASO-MOTOR NERVES.—Professors Bowditch and J. W. Warren have made a series of experiments upon this subject. The view that the temperature of the skin is only dependent on the degree of the vaso-dilatation forms the groundwork of the most recent observations upon the vaso-motor nerves of the extremities. Although this view is very probable, the opinions of different authors are so antagonistic that a new test of the activity of the nerves concerned, by another method, seemed desirable. They made plethysmographic experiments upon the influence of irritation of nerves upon the amount of blood in a limb. Their results are as follow:

1. Irritation of the peripheral end of the freshly-divided sciatic in a curarized cat, by means of tetanizing induction-currents, can cause, in six to fifteen seconds, increase and decrease of volume.
2. Induction-currents quickly succeeding each other, 16 to 64 per second, as a rule, caused a contraction of the blood-vessels (decrease of volume in the limb), whilst slow irritation (4—0.2 beats in a second) was followed by a dilatation.
3. Induction-breaks of great frequency cause in the beginning a contraction, and then a dilatation of the blood-vessels. By forty-two animals, dilatation in one only preceded.
4. By a few experiments, with especially exact methods, to estimate time, the contraction had a latent period of 1.5″, whilst the latent time for a dilatation amounted to about 3.5″.
5. The vaso-dilatation lasts a few minutes after the irritation ceases, whilst the vaso-contraction usually stops with the irritation. —*Centralblatt f. d. med. Wissenschaften*, 1883, No. 29.

THE RELATION BETWEEN THE ACTIVE PHASES OF CONTRACTION AND THE LATENT PERIOD OF SKELETAL MUSCLE.—Drs. Yeo and Cash have made a large number of experiments upon this subject, using the gastrocnemius of the frog. Their results are as follow:

1. Increase in the strength of the stimulus is accompanied by: (*a*) a steady and gradual shortening of the latent period; (*b*) a sudden prolongation of the actual contraction when a certain degree of stimulation is reached; (*c*) an elevation of the altitude of the curve with the early and the final parts, of the increase; and (*d*) a removal of the summit to a later part of the curve as soon as the elongation of the curve is established.
2. Increase in the weight used as a burden for the muscle is accompanied by: (*a*) elongation of the latent period; (*b*) commonly a slight shortening of the duration of the contraction; (*c*) depression of the height of the curve; (*d*) no marked change in the position of the summit except in extreme cases.
3. The application of heat causes: (*a*) very marked and con-